AMENDMENT TO THE CLAIMS

1. (Currently amended) A thrust load enhancement device for a rotor-bearing system, comprising:

a stator mounted on a rotation axis of the rotor-bearing system;

a rotor separated from said stator by a first magnetic air gap on the rotation axis; and

at least one permanent magnet separated from one of: i) said stator and ii) said rotor by a second magnetic air gap;

wherein said at least one permanent magnet, said stator and said rotor form a magnetic circuit characterized by a flux path, a flux in said first and second air gaps generating a compensation force between said rotor and said stator that opposes an external force F_{ext}.

2. (Previously presented) The thrust load enhancement device according to claim 1, wherein the external force F_{ext} is caused by an action selected from the group consisting of pressure and gravity in a vertical shaft configuration wherein a center of gravity is low.

3. (Currently amended) The thrust load enhancement device according to claim 1, wherein said at least one permanent magnet is fixed to said stator; said at least one permanent magnet being separated from said rotor by the second magnetic air gap.

4. (Currently amended) The thrust load enhancement device according to claim 1, wherein said at least one permanent magnet is fixed to said rotor, said at least one permanent magnet being separated from said stator by the second magnetic air gap.

5. (Currently amended) The thrust load enhancement device according to claim 1, wherein a first one of said at least one permanent magnet is fixed to said stator and a second one of said at least one permanent magnet is fixed to said rotor, the second magnetic air gap separating said first permanent magnet from said rotor and said second permanent magnet from said rotor respectively.

6. (Original) The thrust load enhancement device according to claim 5, wherein said first one of said at least one permanent magnet and said second one of said at least one permanent magnet respectively have poles of different polarity facing each other to create an attractive compensation force between said rotor and said stator.

7. (Original) The thrust load enhancement device according to claim 5, wherein said first one of said at least one permanent magnet and said second one of said at least one permanent magnet respectively have poles of a similar polarity facing each other to create an expulsion compensation force between said rotor and said stator.

8. (Currently amended) The thrust load enhancement device according to claim 1, further comprising a spacer to adjust said first and second magnetic air gaps.

9. (Previously presented) The thrust load enhancement device according to claim 1, further comprising a piezoelectric actuator mounted in said stator.

10. (Currently amended) The thrust load enhancement device according claim 5 ~~4~~, wherein said rotor and said stator are made in a material selected from the group consisting of a soft magnetic material and a non-magnetic material.

11. (Previously presented) The thrust load enhancement device according to claim 1, wherein said rotor is made of carbon steel and said stator is made of mild steel.

12. (Previously presented) The thrust load enhancement device according to claim 1, wherein the external force is selected in the group consisting of a static force and a dynamic force.

13. (Previously presented) The thrust load enhancement device according to claim 1, further comprising force measurement devices to measure the compensation force.

14. (Previously presented) The thrust load enhancement device according to 13, wherein said force measurement devices are selected from the group consisting of strain gauges and piezoelectric elements.

15. (Previously presented) The thrust load enhancement device according to claim 1, wherein said load enhancement device is located at one end of a shaft of the rotor-bearing system.

16. (Previously presented) The thrust load enhancement device according to claim 1, wherein the thrust load is unidirectional from an external working load.

17. (Previously presented) The thrust load enhancement device according to claim 1, wherein the thrust load is unidirectional from a rotor weight in a vertical configuration.

18. (Previously presented) The thrust load enhancement device according to claim 1, wherein the external force is an unidirectional external static load selected in the group consisting of a working load and a shaft weight in a vertical configuration.

19. (Previously presented) The thrust load enhancement device according to claim 1, wherein the rotor-bearing system is selected from the group consisting of a magnetic bearing system, a hydrostatic bearing system, a hydrodynamic bearing system, and a rolling element bearing system.

20. (Currently amended) A method for thrust load enhancement for a rotor-bearing system comprising the steps of:

providing a stator on a rotation axis of the rotor-bearing system;

providing a rotor separated on the rotation axis from the stator by a first magnetic air gap; and

providing at least one permanent magnet on at least least one of: i) the stator and ii) the rotor, the at least one permanent magnet being separated from one of: i) the stator and ii) the rotor by a second magnetic air gap,

whereby the at least one permanent magnet, the stator and the rotor form a magnetic circuit characterized by a flux path so that a flux in the first and second magnetic air gaps generates a compensation force between the rotor and the stator that opposes an external force $F_{ext.}$

21. (Currently amended) The method for thrust load enhancement according to claim 25 ~~20~~, wherein said steps of providing a stator and said step of providing a rotor comprise providing a rotor and a stator made in a material selected from the group consisting of a soft magnetic material and a non-magnetic material.

22. (Original) The method for thrust load enhancement according to claim 20, wherein said step of providing a stator comprises providing a stator made of mild steel and said step of providing a rotor comprises providing a rotor made of carbon steel.

23. (Currently amended) The method for thrust load enhancement according to claim 20, wherein said step of providing at least one permanent magnet comprises mounting at least one permanent magnet on the stator, the second magnetic air gap separating the at least one permanent magnet from the rotor.

24. (Currently amended) The method for thrust load enhancement according to claim 20, wherein said step of providing at least one permanent magnet comprises mounting at least one permanent magnet on the rotor, the second magnetic air gap separating the at least one permanent magnet from the stator.

25. (Currently amended) The method for thrust load enhancement according to claim 20, wherein said step of providing at least one permanent magnet comprises fixing a first one of the at least one permanent magnet to the stator and a second one of the at least one permanent magnet to the rotor, the second magnetic air gap separating the first permanent magnet from the rotor and the second permanent magnet from the stator.

26. (Original) The method for thrust load enhancement according to claim 25, wherein said steps of fixing a first one of the at least one permanent magnet to the stator and a second one of the at least one permanent magnet to the rotor comprise arranging respective poles of different polarity thereof facing each other to create an attractive compensation force between the rotor and the stator.

27. (Original) The method for thrust load enhancement according to claim 25, wherein said steps of fixing a first one of the at least one permanent magnet to the stator and a second one of the at least one permanent magnet to the rotor comprises arranging respective poles of similar polarity facing each other to create an expulsion compensation force between the rotor and the stator.

28. (Currently amended) The method for thrust load enhancement according to claim 20, further comprising a step of providing a spacer to adjust said first and said second magnetic air gaps.

29. (Previously presented) The method for thrust load enhancement according to claim 20, further comprising the step of mounting a piezoelectric actuator in the stator.

30. (Previously presented) The method for thrust load enhancement according to claim 20, wherein the external force is selected from the group consisting of a static force and a dynamic force.

31. (Previously presented) The method for thrust load enhancement according to claim 20, further comprising the step of providing force measurement devices to measure the compensation force.

32. (Previously presented) The method for thrust load enhancement according to claim 31, wherein said step of providing force measurement devices comprises selecting devices from the group consisting of strain gauges and piezoelectric elements.

33. (Previously presented) The method for thrust load enhancement according to claim 20, wherein the rotor-bearing system is selected from the group consisting of a magnetic bearing

system, a hydrostatic bearing system, a hydrodynamic bearing system, and a rolling element bearing system.